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Electron scattering in graphene by a correlated charged impurities¹ MICHAEL FUHRER, JUN YAN, JIANHAO CHEN, SHUDONG XIAO, Center for Nanophysics and Advanced Materials, University of Maryland — We study charge transport in graphene with correlated charged impurities. Potassium is deposited on graphene in ultra-high vacuum at temperatures below 20 K, and the conductivity of graphene is measured as a function of carrier density in situ. Upon heating, the potassium ions order due to repulsive interactions, resulting in significant improvement of device mobility due to decrease of long range scattering. The charge density dependence of the conductivity becomes increasingly non-linear with increase of annealing temperature of the potassium/graphene. We find the experimental carrier-density-dependent conductivity in good agreement with a model of correlated charged impurities including a Gaussian-broadened structure factor at a finite wavevector corresponding to the potassium lattice.

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